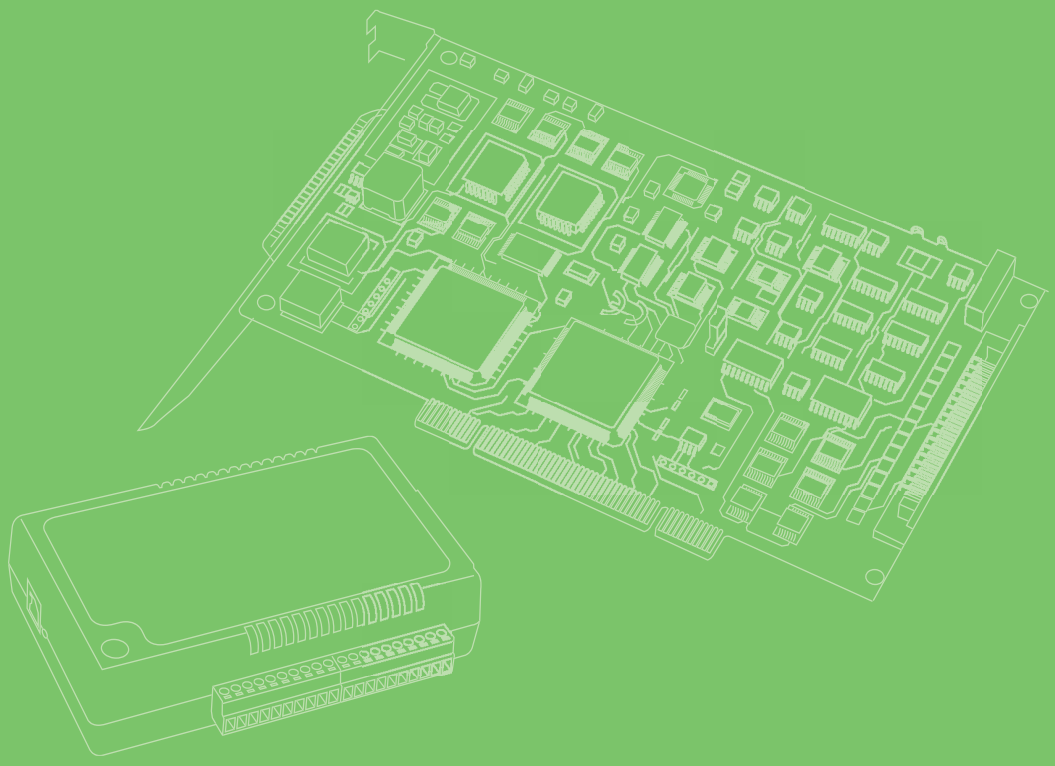

User Manual

# PCI-1761

## 8-ch Relay & 8-ch Isolated Digital Input PCI Card

ADVANTECH
eAutomation

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2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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# Declaration of Conformity

### CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

# Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

# Warnings, Cautions and Notes

***Warning!*** *Warnings indicate conditions, which if not observed, can cause personal injury!*

***Caution!*** *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

*There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

***Note!*** *Notes provide optional additional information.*

# Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

# Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
15. The power cord or plug is damaged.
16. Liquid has penetrated into the equipment.
17. The equipment has been exposed to moisture.
18. The equipment does not work well, or you cannot get it to work according to the user's manual.
19. The equipment has been dropped and damaged.
20. The equipment has obvious signs of breakage.
21. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
22. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
23. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

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# Chapter 1

## Overview

## 1.1 Introduction

Thank you for buying the Advantech PCI-1761. The Advantech PCI-1761 is a 8-channel relay actuator and 8-channel isolated digital input card for the PCI bus. Its eight on-board SPDT relays are ideal for applications such as device ON/OFF control or small power switched. For easy monitoring, each relay is equipped with one red LED to show its ON/OFF status.

The PCI-1761's eight optically-isolated digital input channels are ideal for digital input in noisy environments or with floating potentials. The following sections of this chapter will provide further information about features, installation guide, together with some brief information on software and accessories for the PCI-1761 card.

## 1.2 Features

- 8 relay output channels and 8 isolated digital input channels
- LED indicators to show activated relays
- 4 Form A-type and 4 Form C-type relay output channels
- Output status read-back
- Keep relay output values when hot system reset
- High-voltage isolation on input channels (3,750 $V_{DC}$)
- High ESD protection (2,000 $V_{DC}$)
- High over-voltage protection (70 $V_{DC}$)
- Wide input range (10 ~ 50 $V_{DC}$)
- Interrupt handling capability
- Board ID

The Advantech PCI-1761 offers the following main features:

**Robust Protection**

The PCI-1761 digital input channels feature a robust isolation protection for industrial, lab and machinery automation applications. It durably withstands voltage up to 3,750 $V_{DC}$, preventing your host system from any incidental harms. If connected to an external input source with surge-protection, the PCI-1761 can offer up to a maximum of 2,000 $V_{DC}$ ESD (Electrostatic Discharge) protection. Even with an input voltage rising up to 70 $V_{DC}$, the PCI-1761 can still manage to work properly albeit only for short period of time.

**Wide Input Range**

The PCI-1761 has a wide range of input voltage from 10 to 50 $V_{DC}$, and it is suitable for most industrial applications with 12 $V_{DC}$, 24 $V_{DC}$ and 48 $V_{DC}$ input voltage.

**Reset Protection Fulfills Requirement for Industrial Applications**

When the system has undergone a hot reset (i.e. without turning off the system power), the PCI-1761 can either retain outputs values of each channel, or return to its default configuration as open status, depending on its on-board jumper setting. This function protects the system from wrong operations during unexpected system resets.

### Plug-and-Play Functionality

The PCI-1761 is a Plug-and-Play device, which fully complies with PCI Specification Rev 2.2. During card installation, there is no need to set jumpers or DIP switches. Instead, all bus-related configurations such as base I/O address and interrupt are automatically done by the Plug-and-Play function.

### Board ID

The PCI-1761 has a built-in DIP Switch that helps define each card's ID when multiple PCI-1761 cards have been installed on the same PC chassis. The board ID setting function is very useful when users build their system with multiple PCI-1761 cards. With correct Board ID settings, you can easily identify and access each card during hardware configuration and software programming.

## 1.3 Applications

- Industrial On/Off control
- Switch status sensing
- Digital I/O control
- Industrial and lab automation
- SMT/PCB machinery
- Semi-conductor machinery
- PC-based Industrial Machinery
- Testing & Measurement
- Laboratory & Education
- External relay driving

## 1.4 Installation Guide

Before you install your PCI-1761 card, please make sure you have the following necessary components:

- PCI-1761 card
- PCI-1761 User's Manual
- Driver software - Advantech DLL drivers (included in the companion CD-ROM)
- Wiring cable - PCL-10137 (optional)
- Wiring board - ADAM-3937 (optional)
- PC or workstation with a PCI-bus slot (running Windows XP/Vista/7)
- Application software - ActiveDAQ Pro or other 3rd-party software

After you get the necessary components and maybe some of the accessories for enhanced operation of your Multifunction card, you can then begin the Installation procedures.

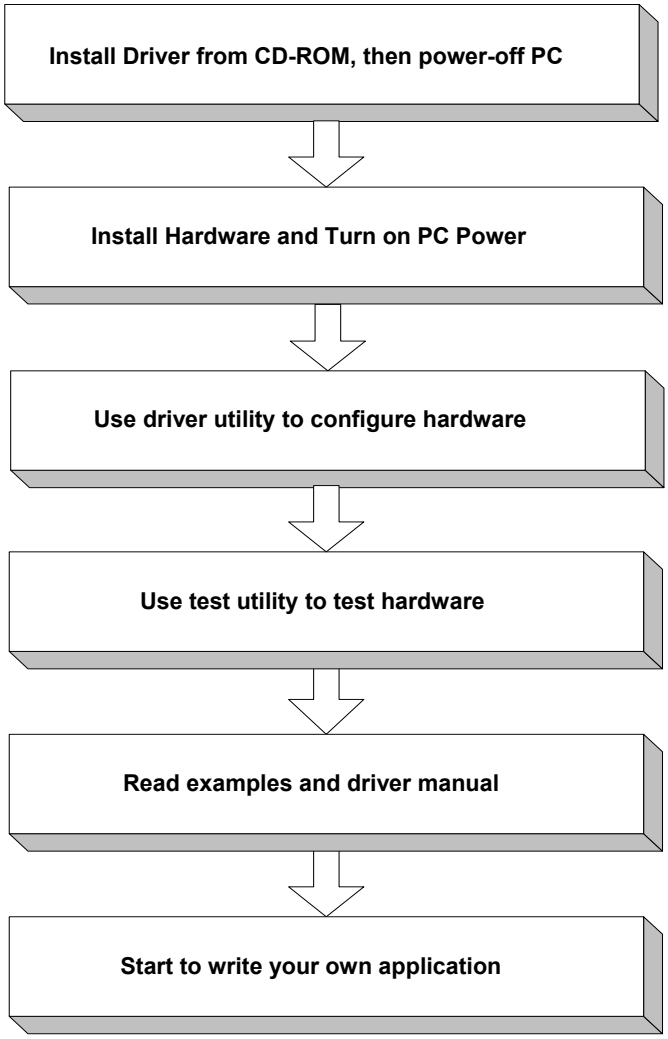

Install Driver from CD-ROM, then power-off PC
Install Hardware and Turn on PC Power
Use driver utility to configure hardware
Use test utility to test hardware
Read examples and driver manual
Start to write your own application

**Figure 1.1 Installation Flow Chart**

## 1.5 Software Overview

Advantech offers a rich set of DLL drivers, third-party driver support and application software to help fully exploit the functions of your PCI-1761 card:

- DLL driver (on the companion CD-ROM)
- LabVIEW driver
- Advantech ActiveDAQ Pro

Programming choices for DA&C cards: You may use Advantech application software such as Advantech DLL driver. On the other hand, advanced users are allowed another option for register-level programming, although not recommended due to its laborious and time-consuming nature.

**DLL Driver**

The Advantech DLL Drivers software is included on the companion CD-ROM at no extra charge. It also comes with all the Advantech DA&C cards. Advantech's DLL driver features a complete I/O function library to help boost your application performance. The Advantech DLL driver for Windows XP/Vista/7 works seamlessly with development tools such as Visual C++, Visual Basic and Visual Studio .Net

### Register-level Programming

Register-level programming is reserved for experienced programmers who find it necessary to write codes directly at the level of device registers. Since register-level programming requires much effort and time, we recommend that you use the Advantech DLL drivers instead. However, if register-level programming is indispensable, you should refer to the relevant information in Appendix C, Register Structure and Format.

## 1.6 Accessories

Advantech offers a complete set of accessory products to support the PCI-1761 card. These accessories include:

### Wiring Cable

The PCL-10137 shielded cable is specially designed for PCI-1761 cards to provide high resistance to noise. To achieve a better signal quality, the signal wires are twisted in such a way as to form a "twisted-pair cable", reducing cross-talk and noise from other signal sources. Furthermore, its analog and digital lines are separately sheathed and shielded to neutralize EMI/EMC problems.

### Wiring Boards

The ADAM-3937 is a 37-pin D-type wiring terminal module for DIN-rail mounting. This terminal module can be readily connected to the Advantech PC-Lab cards and allow easy yet reliable access to individual pin connections for the PCI-1761 card.

# Chapter 2

## Installation

## 2.1 Unpacking

After receiving your PCI-1761 package, please inspect ita contents first. The package should contain the following items:

- PCI-1761 card
- Companion CD-ROM (DLL driver included)
- Startup Manual

## 2.2 Switch and Jumper Settings

The PCI-1761 card has one function switch settings.

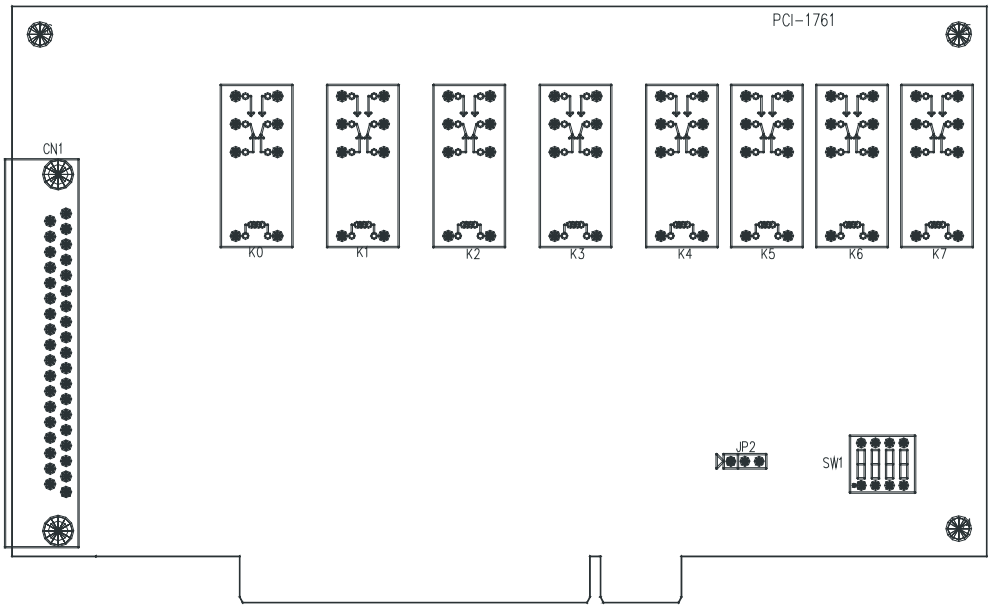



**Figure 2.1 Card Connector, Jumper and Switch Locations**

**Table 2.1: Summary of Jumper Settings**

| Names of Jumpers | Function Description | |
|---|---|---|
| JP2 | | Keep last status after hot reset |
| | | Default configuration |

### Setting the Time to Reset the Relay Outputs

Some users will want the capability of clearing each relay output when the system (or PC) issues a reset signal on the PCI bus. Some users will want to clear their relays only as part of system power-on. The PCI-1761 satisfies both these needs by providing jumper JP2. Depending on the application, this capability may allow relay outputs to be "OFF" without requiring a complete shutdown of processes controlled by the card.

## 2.3 I/O Connectors

### Pin Assignments

Figure 2-2 shows the pin assignments for the 37-pin I/O connector on the PCI-1761

**Description of pin use:**

**IDI*n*A* (*n*=0 ~ 7):**

Isolated digital input A

**IDI*n*B* (*n*=0 ~ 7):**

Isolated digital input B

**R*n*_NO(*n*=0 ~ 7):**

Normally Open pin of relay output

**R*n*_NC(*n*=0 ~ 7):**

Normally Close pin of relay output

**R*n*_COM(*n*=0 ~ 7):**

Common pin of relay output

**Note:**

Isolated Digital Input is bidiretional.

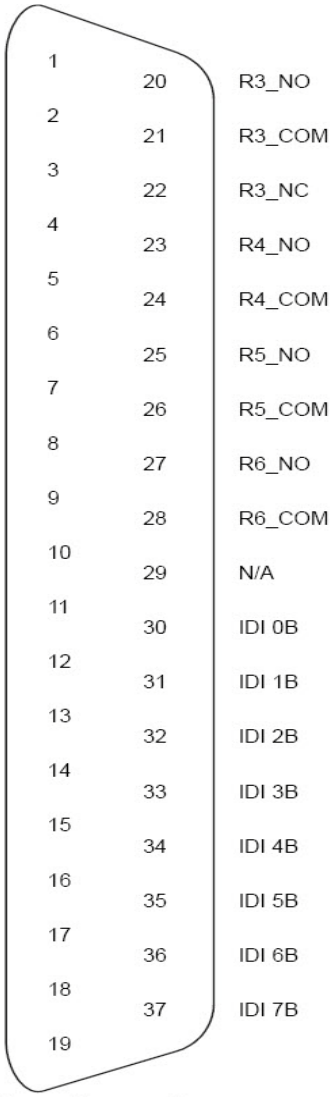



**Figure 2.2 I/O Connector Pin Assignments**

## 2.4 Driver Installation

We recommend you install the driver before you install PCI-1761 card into your system, since this will guarantee a smooth installation process. The 32-bit DLL driver Setup program for the PCI-1761 card is included on the companion CD-ROM that is shipped with your DA&C card package. Please follow the steps below to install the driver software:

1. Insert the companion CD-ROM into your CD-ROM drive.
2. The Setup program will be launched automatically if you have the autoplay function enabled on your system. When the Setup Program is launched, you'll see the following Setup Screen.

***Note!*** *If the autoplay function is not enabled on your computer, use Windows Explorer to execute SETUP.EXE on the companion CD-ROM.*

**Figure 2.3 Advantech Automation Software Setup**

3. Select the Device Manager option to install.
4. Select the Individual Driver option.
5. Select the specific device then follow the installation instructions step by step to complete your device driver installation and setup.

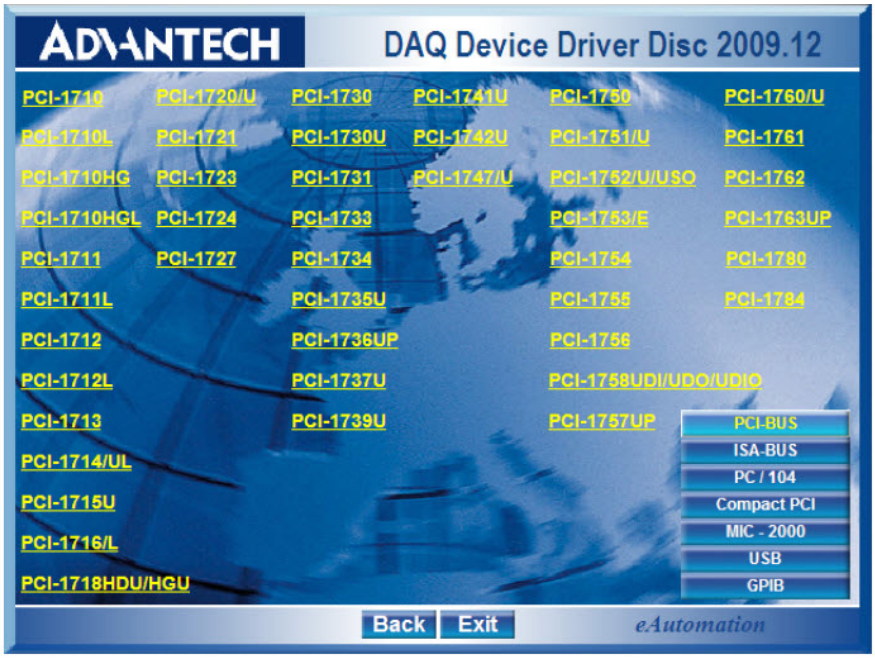



**Figure 2.4 Driver Setup Options**

For further information on driver-related issues, an online version of the Device Drivers Manual is available by accessing the following path:

*Start/Programs/Advantech Automation/Device Manager/Device Drivers Manual*

## 2.5 Hardware Installation

***Note!*** *Make sure you have installed the driver first before you install the card (please refer to 2.4 Driver Installation)*

After the DLL driver installation is completed, you can now go on to install the PCI-1761 card in any PCI slot on your computer. But it is suggested that you should refer to the computer user manual or related documentation if you have any doubt. Please follow the steps below to install the card on your system.

1. Turn off your computer and unplug the power cord and cables. TURN OFF your computer before installing or removing any components on the computer.
2. Remove the cover of your computer.
3. Remove the slot cover on the back panel of your computer.
4. Touch the metal part on the surface of your computer to neutralize the static electricity that might be on your body.
5. Insert the 1761 card into a PCI slot. Hold the card only by its edges and carefully align it with the slot. Insert the card firmly into place. Use of excessive force must be avoided, otherwise the card might be damaged.
6. Fasten the bracket of the PCI card on the back panel rail of the computer with screws.
7. Connect appropriate accessories (37-pin cable, wiring terminals, etc. if necessary) to the PCI card.
8. Replace the cover of your computer chassis. Re-connect the cables you removed in step 2.
9. Plug in the power cord and turn on the computer .

After the PCI-1761 card is installed, you can verify whether it is properly installed on your system in the Device Manager:

1. Access the Device Manager through Control Panel/System/Device Manager.
2. The device name of the PCI-1761 should be listed on the Device Manager tab on the System Property Page.

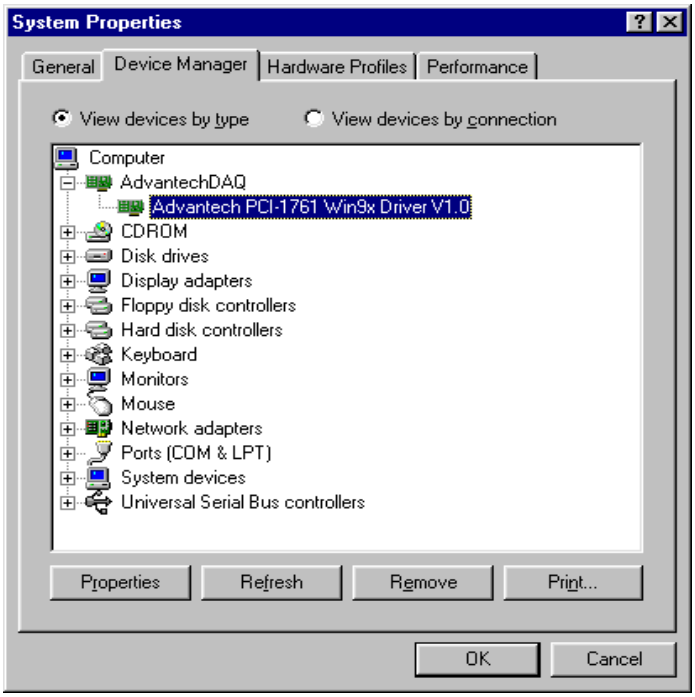



**Figure 2.5 Device Name on the Device Manager**

***Note!*** *If your card is properly installed, you should see the device name of your card listed on the Device Manager tab. If you do see your device name listed on it but marked with an exclamation sign "!", it means your card has not been correctly installed. In this case, remove the card from the Device Manager by selecting its device name and press the Remove button. Then go through the driver installation process again.*

After your card is properly installed on your system, you can now configure your device using the Device Installation Program that has itself already been installed on your system during driver setup. A complete device installation procedure should include device setup, configuration and testing. The following sections will guide you through the Setup, Configuration and Testing of your device.

## 2.6 Device Setup & Configuration

The Advantech Device Manager program is a utility that allows you to set up, configure and test your device, and later stores your settings on the system registry. These settings will be used when you call the APIs of Advantech Device Drivers.

### Setting Up the Device

1. To install the I/O device for your card, you must first run the Device Manager program (by accessing Start/Programs/Advantech Automation/Device Manager/ Advantech Device Manager ).
2. You can then view the device(s) already installed on your system (if any) on the Installed Devices list box. If the software and hardware installation are completed, you will see PCI-1761 card in the Installed Devices list.

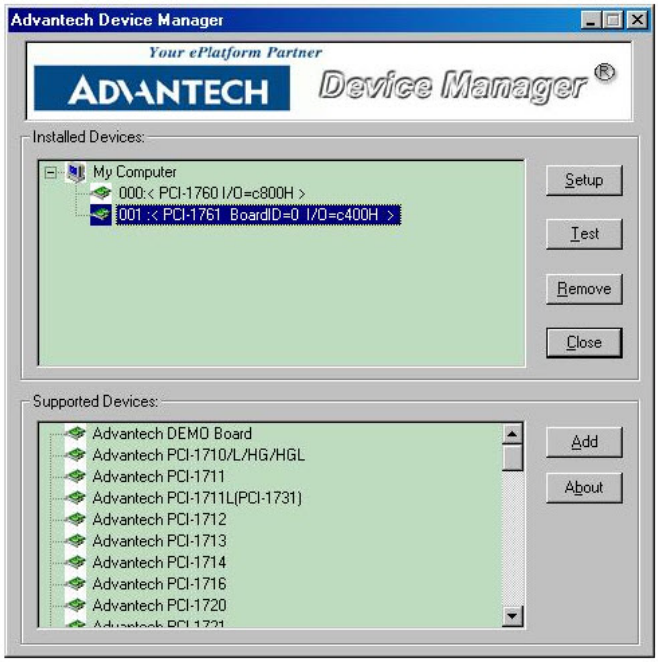



**Figure 2.6 Device Manager Dialog Box**

### Configuring the Device

3. Please click the Setup button to configure your device. On the Device Setting dialog box (Fig. 2-7), you can configure the ID0 ~ ID7 Interrupt trigger mode either as Rising Edge or Falling Edge.

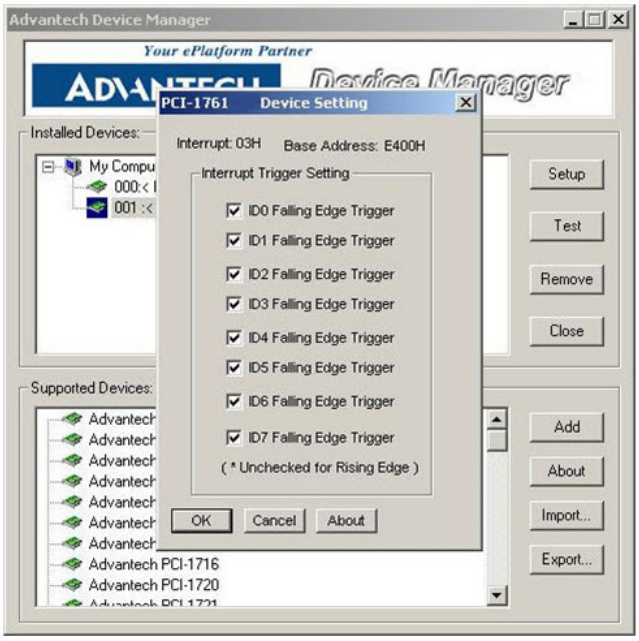



**Figure 2.7 Device Setting Dialog Box**

After your card is properly installed and configured, you can click the Test button to

***Note!*** *As we have noted, the device name 001:<PCI-1761 BoardID=0 I/O=c400H> begins with a device number "001", which is specifically assigned to each card. The device number is passed to the driver to specify which device you wish to control.*

test your hardware by using the testing utility we supplied.

# Chapter 3

## Signal Connections

## 3.1 Overview

Maintaining signal connections is one of the most important factors in ensuring that your application system is sending and receiving data correctly. A good signal connection can avoid unnecessary and costly damage to your PC and other hardware devices. This chapter provides useful information about how to connect input and output signals to the PCI-1761 via the I/O connector.

## 3.2 Isolated Digital Input Connections

The PCI-1761 has 8 isolated digital input channels designated IDI0~IDI7. Each of isolated digital input channel accepts 10~50 $V_{DC}$ voltage inputs, and accept bi-directional input. It means that you can apply positive or negative voltage to an isolated input pin (Vin ). The figure below shows how to connect an external input source to one of the card's isolated input channels.

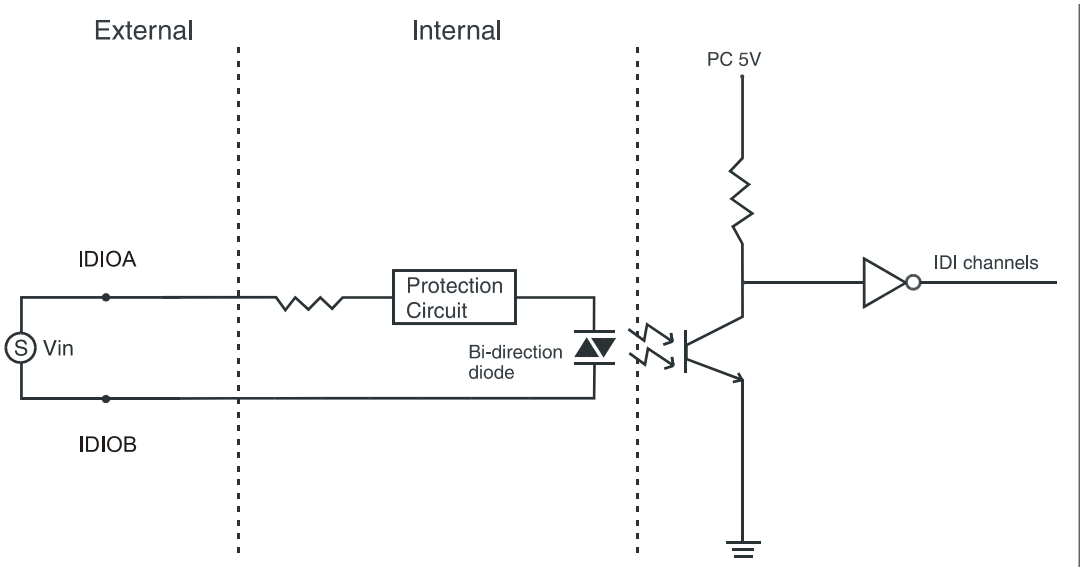



**Figure 3.1 Isolated Digital Input Connections**

## 3.3 Relay Connections

After power on, the initial relay output status of PCI-1761 is shown as below:

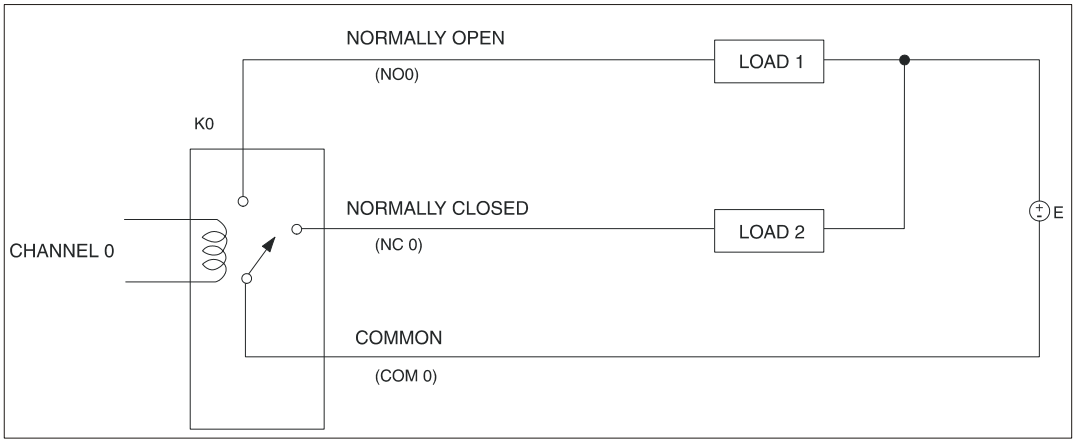



**Figure 3.2 Relay Output Connection**

A write operation to I/O address, BASE +0, will change the output status of each relay. For example, if Bit 0 of BASE +0 is set "1" (logic high), relay 0, K0, will switch from position "NORMALLY CLOSED", R0_NC, to position "NORMALLY OPEN", R0_NO. This means that LOAD2 will be de-energized, while LOAD1 is energized.

To summarize, the "COMMON" line connect to the "NORMALLY CLOSED" line, if the corresponding bit is set as 0 (power-on initial status). Otherwise, if the corresponding bit is set as 1, then the "COMMON" line will connect to the "NORMALLY OPEN" line.

# Appendix A

## Specifications

# A.1 Specifications

| Table A.1: Isolated Digital Input | | |
|---|---|---|
| Number of Input Channel | | 8 |
| Optical Isolation | | 3750 $V_{DC}$ |
| Opto-isolator response time | | 25μs |
| Over-voltage Protect | | 70 $V_{DC}$ |
| Input Voltage | VIH (max.) | 50 $V_{DC}$ |
| | VIH (min.) | 10 $V_{DC}$ |
| | VIL (max.) | 3 $V_{DC}$ |
| Input Current | 10 $V_{DC}$ | 1.6 mA (typical) |
| | 12 $V_{DC}$ | 1.9 mA (typical) |
| | 24 $V_{DC}$ | 4.1 mA (typical) |
| | 48 $V_{DC}$ | 8.5 mA (typical) |
| | 50 $V_{DC}$ | 8.9 mA (typical) |

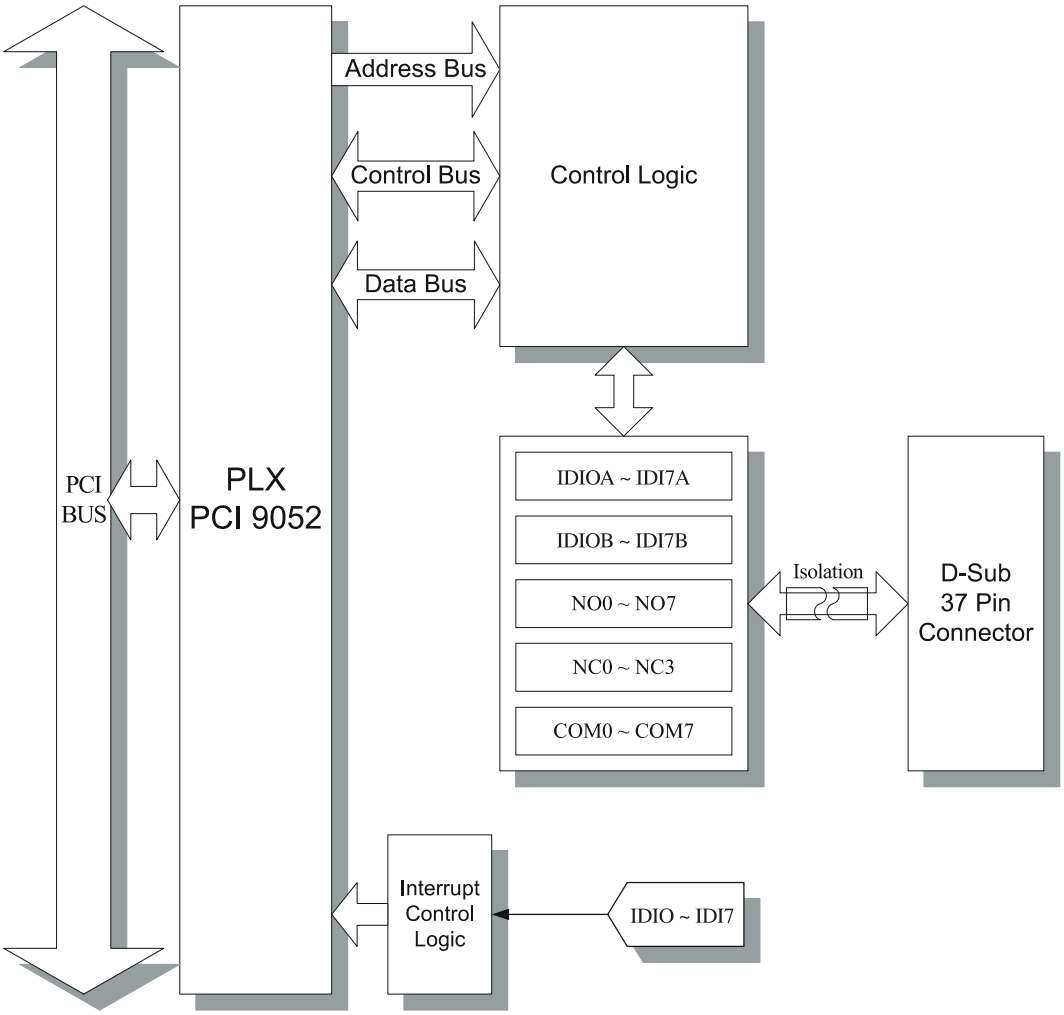
| Table A.2: Relay Output | | |
|---|---|---|
| Number of Output Channel | | 8 |
| Relay Type | | SPDT (4 Form C and 4 Form A) |
| Contact Rating (resistive) | | 8A@250$V_{AC}$, 2A@30$V_{DC}$ |
| Max. Switching Power | | 2000VA, 60W |
| Max. Switching Voltage | | 400$V_{AC}$, 300$V_{DC}$ |
| Max. Switching Current | | 8A |
| Min. Switching Load | | 12V / 100mA |
| Breakdown Voltage | Between Coil and Contacts | 5000$V_{AC}$ min. (1 minute) |
| | Between Open Contacts | 1000$V_{AC}$ min. (1 minute) |
| | Between Adjacent Contacts | 2500$V_{AC}$ min. (1 minute) |
| Operate/Release Time | | typ. 7 / 2 ms, max. 15 / 6 ms |
| Resistance | | Contact: 100 mΩ max. @ 1A/12$V_{DC}$<br>Insulation: 10 GΩ min. @ 25°C/ 500$V_{DC}$/50%RH |
| Life Expectancy | Mechanical | 3 x $10^7$ cycles min. |
| | Electrical | $10^5$ cycles min. @ 8A/250$V_{AC}$<br>2 x $10^5$ cycles min. @ 3A/250$V_{AC}$ |

| Table A.3: General Specifications | | |
|---|---|---|
| I/O Connector Type | 37-pin D-type female | |
| Dimensions | 175 mm x 100 mm (6.9" x 3.9") | |
| Power Consumption | +5V @ 220 mA (typical)<br>+5V @ 750 mA (max.) | |
| Temperature | Operating | 0 ~ +60 °C (32 ~ 140°F)<br>(refer to IEC 68-2-1,2) |
| | Storage | -20 ~ +70 °C (-4 ~158 °F) |
| Relative Humidity | 5 - 95 % RH non-condensing<br>(refer to IEC 68-2-3) | |
| Certifications | CE Class A certified | |

# Appendix B

## Block Diagram

# B.1 Block Diagram



# Appendix C

## Register Structure and Format

# C.1 Overview

The PCI-1761 is delivered with an easy-to-use 32-bit DLL driver for user programming under the Windows XP/Vista/7 operating system. We advise users to program the PCI-1761sing the 32-bit DLL driver provided by Advantech to avoid the complexity of low-level programming by register. The most important consideration in programming the PCI-1761 the register level is to understand the function of the card's registers. The information in the following sections is provided only for users who would like to do their own low-level programming.

# C.2 I/O Port Address Map

The PCI-1761 requires 32 consecutive addresses in the PC's I/O space. The address of each register is specified as an offset from the card's base address. For example, BASE+0 is the card's base address and BASE+7 is the base address plus seven bytes. Table C-1 shows the function of each register of the PCI-1761 or driver and its address relative to the card's base address.

**Table C.1: Register Functions**

| Base Addr, + Hex | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| 0H | R | Relay Output Status | | | | | | | |
| | | RS7 | RS6 | RS5 | RS4 | RS3 | RS2 | RS1 | RS0 |
| | W | Relay Output | | | | | | | |
| | | RO7 | RO6 | RO5 | RO4 | RO3 | RO2 | RO1 | RO0 |
| 1H | R | Isolated Digital Input | | | | | | | |
| | | IDI7 | IDI | IDI5 | IDI4 | IDI3 | IDI2 | IDI1 | IDI0 |
| | W | N/A | | | | | | | |
| | | | | | | | | | |
| 2H | R | Board ID Register | | | | | | | |
| | | | | | | BD3 | BD2 | BD1 | BD0 |
| | W | N/A | | | | | | | |
| | | | | | | | | | |
| 3H | R | Interrupt Enable Status | | | | | | | |
| | | IDI7EN | IDI6EN | IDI5EN | IDI4EN | IDI3EN | IDI2EN | IDI1EN | IDI0EN |
| | W | Interrupt Enable Register | | | | | | | |
| | | IDI7EN | IDI6EN | IDI5EN | IDI4EN | IDI3EN | IDI2EN | IDI1EN | IDI0EN |
| 4H | R | Interrupt Triggering Status | | | | | | | |
| | | IDI7RF | IDI6RF | IDI5RF | IDI4RF | IDI3RF | IDI2RF | IDI1RF | IDI0RF |
| | W | Interrupt Triggering Register | | | | | | | |
| | | IDI7RF | IDI6RF | IDI5RF | IDI4RF | IDI3RF | IDI2RF | IDI1RF | IDI0RF |
| 5H | R | Interrupt Flag | | | | | | | |
| | | IDI7F | IDI6F | IDI5F | IDI4F | IDI3F | IDI2F | IDI1F | IDI0F |
| | W | Interrupt Clear Register | | | | | | | |
| | | IDI7CLR | IDI6CLR | IDI5CLR | IDI4CLR | IDI3CLR | IDI2CLR | IDI1CLR | IDI0CLR |

## C.3 C.3 Relay I/O Registers - BASE+0H

The PCI-1761 offers 8-ch relay actuators. These I/O channels use the input and output ports at addresses **BASE+0H.**

**Table C.2: Register for Relay Output Status**

| Read | Relay Output Status | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bit # | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| BASE +0H | RS7 | RS6 | RS5 | RS4 | RS3 | RS2 | RS1 | RS0 |

**Table C.3: Register for Relay Output**

| Write | Relay Output | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bit # | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| BASE +0H | RO7 | RO6 | RO5 | RO4 | RO3 | RO2 | RO1 | RO0 |

***Note!*** *The default configuration of the digital output channels is a logic 0. This avoids damaging external devices during system start-up or reset since the power on status is set to the default value.*

## C.4 Isolated Digital Input Registers - BASE+1H

The PCI-1761 offers 8-ch isolated digital input channels. These channels use the input ports at addresses **BASE+1H**.

| Register for Isolated Digital Input | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Read | Isolated Digital Input | | | | | | | |
| Bit # | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| BASE +1H | IDI7 | IDI6 | IDI5 | IDI4 | IDI3 | IDI2 | IDI1 | IDI0 |

## C.5 Board ID - BASE+2H

The PCI-1761 offers Board ID register **BASE+2H**. With correct Board ID settings, user can easily identify and access each card during hardware configuration and software programming.

**Table C.4: Register for Board ID**

| Read | Board ID | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bit # | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| BASE +2H | | | | | BD3 | BD2 | BD1 | BD0 |

**BD3 ~ DB0** **Board ID**

BD0 LSB of the Board ID

BD3 MSB of the Board ID

## C.6 Interrupt Status Register - BASE+3H/4H/5H

The ***Interrupt Status Register*** control the status of eight interrupt signal sources (IDI0 ~ IDI7).

**Table C.5: Register for Interrupt Status**

| Read | Interrupt Status Register | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bit # | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| BASE +3H | IDI7EN | IDI6EN | IDI5EN | IDI4EN | IDI3EN | IDI2EN | IDI1EN | IDI0EN |
| BASE +4H | IDI7RF | IDI6RF | IDI5RF | IDI4RF | IDI3RF | IDI2RF | IDI1RF | IDI0RF |
| BASE +5H | IDI7F | IDI6F | IDI5F | IDI4F | IDI3F | IDI2F | IDI1F | IDI0F |

**IDI*n*F** **Interrupt flag bits (*n* = 0 ~ 7)**

This bit is a flag indicating the status of an interrupt.
User can read this bit to get the status of the interrupt

0 No interrupt
1 Interrupt occurred

**IDI*n*RF** **Interrupt enable control bits (*n* = 0 ~ 7)**

Read this bit to Enable/Disable the interrupt.

0 Disable
1 Enable

**IDI*n*EN** **Interrupt triggering control bits (*n* = 0 ~ 7)**

The interrupt can be triggered by a rising edge or falling edge of the interrupt signal, as determined by the value in this bit.

0 Rising edge trigger
1 Falling edge trigger

## C.7 Interrupt Control Register - BASE+3H/4H/5H

The Interrupt Control Register control the status of two interrupt signal sources (IDI0 ~ IDI7). The user can clear the interrupt by writing its corresponding value to the Interrupt Control Register, as shown in below table.

**Table C.6: Register for Interrupt Control**

| Write | Interrupt Control Register | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bit # | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| BASE +3H | IDI7EN | IDI6EN | IDI5EN | IDI4EN | IDI3EN | IDI2EN | IDI1EN | IDI0EN |
| BASE +4H | IDI7RF | IDI6RF | IDI5RF | IDI4RF | IDI3RF | IDI2RF | IDI1RF | IDI0RF |
| BASE +5H | IDI7CLR | IDI6CLR | IDI5CLR | IDI4CLR | IDI3CLR | IDI2CLR | IDI1CLR | IDI0CLR |

**IDI*n*CLR** **Interrupt clear control bits (*n* = 0 ~ 7)**

This bit must first be cleared to service the next interrupt.

0 Don't care

1 Clear the interrupt

**IDI*n*RF** **Interrupt enable control bits (*n* = 0 ~ 7)**

Read this bit to Enable/Disable the interrupt.

0 Disable

1 Enable

**IDInEN** **Interrupt triggering control bits (n = 0 ~ 7)**

The interrupt can be triggered by a rising edge or falling edge of the interrupt signal, as determined by the value in this bit.

0 Rising edge trigger

1 Falling edge trigger

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